Carol L. Bjelland
Director
Regulatory Matters

May 15, 1996

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N. W.
Washington, D. C. 20554

RE: EX PARTE: CC Docket No. 92-115

Dear Mr. Caton:

This letter shall serve as written notification that, on this day, Bob Sclafani and Alan Wolfe, representing GTE Mobilnet and the undersigned, on behalf of GTE Service Corporation, met with Dr. Tom Stanley of the Commission's Wireless Telecommunications Bureau to discuss issues concerning the above-referenced proceeding. Specifically, GTE addressed issues previously raised by other parties concerning Section 22.919 of the Commission's rules. The attached materials were used to faciliate this discussion.

Please include this notification, and the attached discussion materials, in the record of this proceeding in accordance with the Commission's rules concerning ex parte communications.

Sincerely,

Carol L. Bjelland

Attachments

CC: T. Stanley

SECTION 22.919

CELLULAR NETWORKS HAVE BEEN DESIGNED TO OPERATE BASED ON UNIQUE ESN-MIN COMBINATION

CELLULAR ESN IS SIMILAR TO VEHICLE IDENTIFICATION NUMBER

UNIQUE ESN-MIN COMBINATION IDENTIFIES CELLULAR SUBSCRIBERS AND EQUIPMENT FOR TRACKING HOME USERS AND ROAMERS

EMULATED ESN's COMPROMISE CELLULAR NETWORK MOBILITY MANAGEMENT AND EFFICIENT CELLULAR NETWORK OPERATIONS

EMULATED ESN's AFFECT WIRELESS E911 LOCATION PROPOSALS UNDER CONSIDERATION IN WT DOCKET 94-102

EMERGENCY SERVICE OPERATORS MAY MISTAKENLY IDENTIFY E911 CALLER LOCATION IN CASES WHERE THE EMULATED ESN AND NON-EMULATED ESN PHONES ARE "ON" SIMULTANEOUSLY

USE OF EMULATED ESN's COMPROMISES EXISTING CELLULAR SERVICE PROVIDER AUTOMATIC FRAUD DETECTION SYSTEMS

EMULATED ESN's ARE INDISTINGUISHABLE IN CELLULAR NETWORK

PROLIFERATION OF EMULATED ESN's DETRIMENTALLY AFFECTS THE MAGNITUDE OF THE FRAUD PROBLEM CELLULAR SERVICE PROVIDERS MUST MANAGE

EMULATED ESN's ARE INCOMPATIBLE WITH NEW FRAUD DETECTION AND PREVENTION MEASURES SUCH AS "RF FINGERPRINTING" AND AUTHENTICATION THAT OPERATE BASED ON UNIQUE ESN-MIN COMBINATIONS

GTE CURRENTLY OFFERS CELLULAR PHONE EXTENSION SERVICE

UTILIZE SEPARATE AND DISTINCT ESN-MIN COMBINATIONS

NOT DISRUPTIVE TO EFFICIENT NETWORK OPERATIONS OR MOBILITY MANAGEMENT

GENERAL OVERVIEW

EXTENSION SERVICE PLUS - ONE PLAN - TWO PHONES ONE NUMBER

Extension Service Plus (ESP)	One Plan	Two Phones One Number (TFON)
• Sequential Ringing Product • Customer selects one phone to be the primary and a different phone to be the secondary • Incoming calls placed to the primary phones number will be forwarded to the secondary phones, if the primary phone is unanswered or busy • Bundles minutes and access charges in one bill • Each phone has a unique Mobile Directory Number and Electronic Serial Number (ESN) • Both phones can be used simultaneously	• Uses the AT&T switch feature - Multiple Units Same Directory Number (MUSDN) • Assigns the same Mobile Directory Number to two phones • Each phone retains a unique Electronic Serial Number (ESN) • Only one phone can be on at any one time • Designed for someone with a car phone and a handheld	• Simultaneously rings two phones • Each phone has a unique Mobile Directory Number and Electronic Serial Number (ESN) • Both phones can be used simultaneously • Bundles minutes and access charges in one bill
• Primary phone always rings first, then if no answer or busy switch transfers call to secondary phone • Busy/No Answer Transfer is permanently set at the switch, forwarding calls to the secondary phone	• Mobile Switch will ring whichever phone is on • One phone is primary the other is secondary	• Both phones ring at once • Incoming call it sent to Adjunct Service Platform (ASP), ASP Rings both phones at the same time, first to answer the call gets the call • No primary or secondary phones
• Roam with either phone to make outgoing calls • ESP will not work for incoming calls in a non-Automatic Call Delivery (ACD) market unless secondary phone is roaming and primary is in home area. • Both phones can be on at same time • Can make simultaneous calls on both phones • Can call from one phone to the other • Bill detail by phone • Both phones share 1 voice mail and features	• Can not use both phones at once, one phone must be off • Can not call from one phone to the other • Bill detail groups both phones together • Both phones share 1 voice mail • Ability to roam with secondary phone is limited to selected markets	• Roam with either phone. No problem in either ACD or non-ACD markets • Both phones can be on at same time; each phone works independently of the other • Requires new third phone number Can use new third number as new incoming number, or keep existing cellular number as the incoming number and use the new number on one of the phones • Can make simultaneous calls on both phones • Can call from one phone to the other • Bill detail by phone • Can either share voice mail or each phone have their own Features are shared between the lines

Extension Phone Service

GTE

Technology

Three Extension Phone Service Offerings

- *Extension Service Plus*
- *One Plan*
- *Two Phones One Number*

Extension Service Plus

- *Each phone has unique MIN/ESN*
- *Calling Party given MIN of primary phone*
- *Primary phone is given Call Forward - No Answer / Busy to secondary phone*
- *Both phones can roam*
- *Phones can call each other*

One Plan

- *Each phone has unique ESN - same MIN*
- *Only one phone on at a time*
- *Only one phone can roam at a time*
- *When valid phone is roaming call will be delivered to roam system*
- *Phones cannot call each other*

Two Phones One Number

- *Each phone has unique MIN/ESN*
- *Calling Party given third pilot number*
- *Calls to pilot number ring both phones simultaneously*
- *First phone to answer call gets connected*
- *Both phones can roam*
- *Phones can call each other*

RF Fingerprinting

GTE

Technology

Technical Overview

- *How RF Fingerprinting works*
- *Critical Assumption*

Four Step Process

- *Detect*
- *Fingerprint*
- *Compare*
- *Decide*

Detect

- *Specialized Receivers deployed in area of interest*
- *Monitors Reverse Control Channel*

Fingerprint

- *System learns RF Fingerprint of phone (MIN/ESN)*
- *Fingerprint stored for comparison*

Compare

- *Specialized Receiver listens for call originations / terminations*
- *Specialized Receiver fingerprints phone (MIN/ESN)*
- *Compares with stored fingerprint*

Decide

- *If fingerprints match call goes through*
- *If fingerprints do not match call is terminated*

Summary

- *System determines fingerprint of phone (MIN/ESN)*
- *Multiple phones with same (MIN/ESN) will reduce effectiveness of the system*

Cellular Authentication

GTE

Technology

Participants

- *Mobile Station (MS)*
- *Authentication Center (AC)*
- *Home Location Register (HLR)*
- *Visitor Location Register (VLR)*

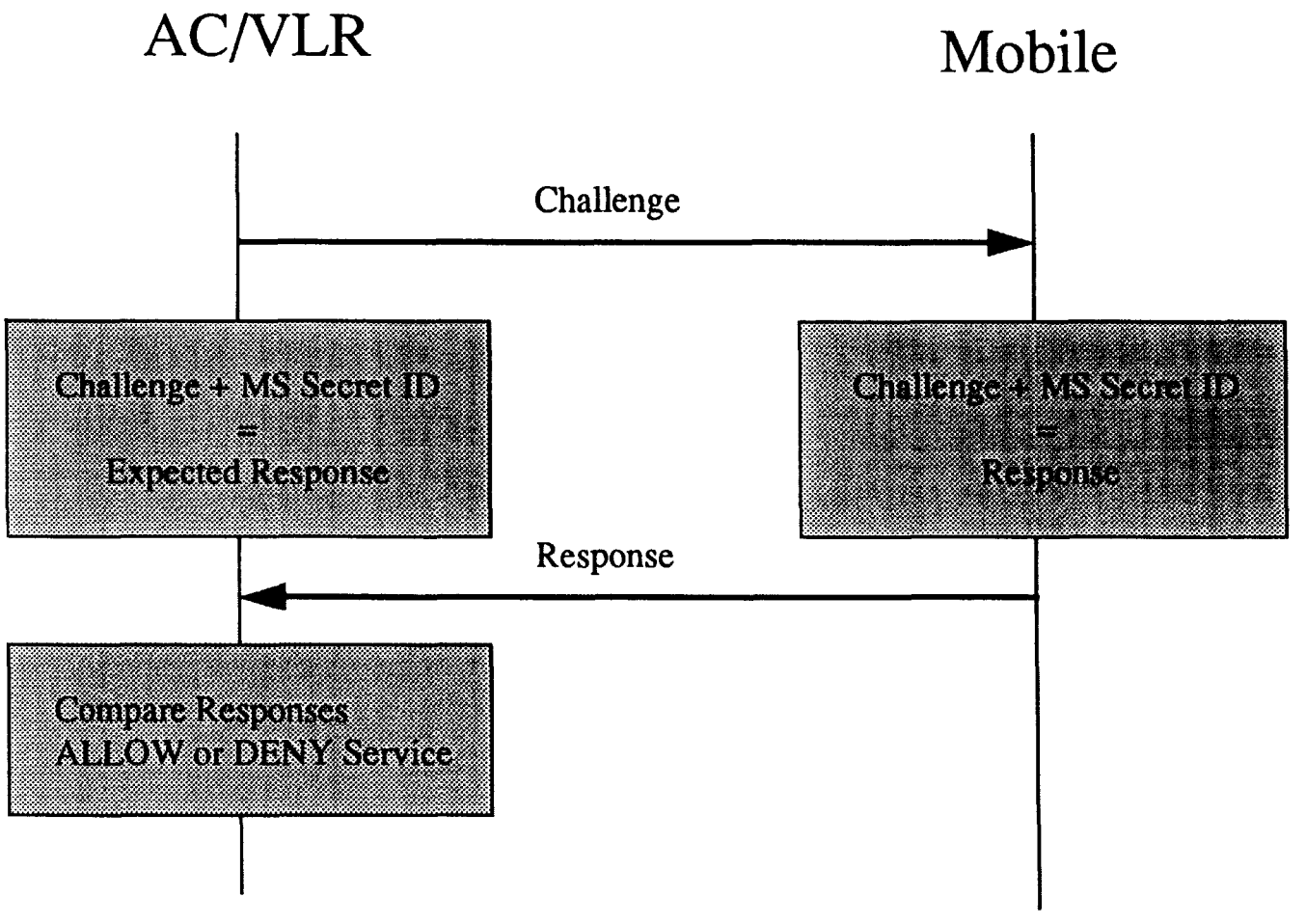
Participants (contd)

- *Home subscribers authenticated by the AC*
- *All communication with the AC is via the HLR*
- *Roamers are authenticated by:*
  - *AC, if SSD is NOT shared*
  - *VLR, if SSD is shared*

Authentication Center (AC)

- *A new TR45 Network Element*
- *Can either be a stand-alone unit, or integrated with the HLR*
- *Responsible for authenticating mobiles, and thereby ALLOW or DENY service*
- *AC functionality is built into the VLRs as well.*

Basic Concept



Technical Overview - CAVE

- *Cellular Authentication and Voice Encryption algorithm*
- *Used to calculate:*
  - *Shared Secret Data (SSD)*
  - *Global Challenge Response (AUTHR)*
  - *Unique Challenge Response (AUTHU)*

Technical Overview - CAVE Key Variables

- ***A-Key*** *(20 digits + 6 digit checksum) is known ONLY to the MS and AC, NOT a PIN*
- *RANDSSD is a periodically changed random number by the AC*
- ***SSD*** *= f(A-Key, ESN, MIN1, RANDSSD)*
- ***"COUNT"*** *validation - not implemented by Lucent*

Technical Overview - SSD Update

- *Randomly scheduled by the AC, on a per mobile basis*
- *Requires MS to authenticate the AC, as well*
- *A successful "Unique Challenge" is mandatory*
- *Occurs on "Bearer" channels ONLY for Roamers*

Technical Overview - Global Challenge

- *When SSD is shared, VLR conducts the Global Challenge for Roamers*
- *RAND, a random number, included in the OMT (FoCC)*
- *AUTHR from MS = f(SSD, RAND, ESN, MIN1) on Initial registration*
- *AUTHR from MS = f(SSD, RAND, ESN, Dialed Digits) on Originations and Page responses*